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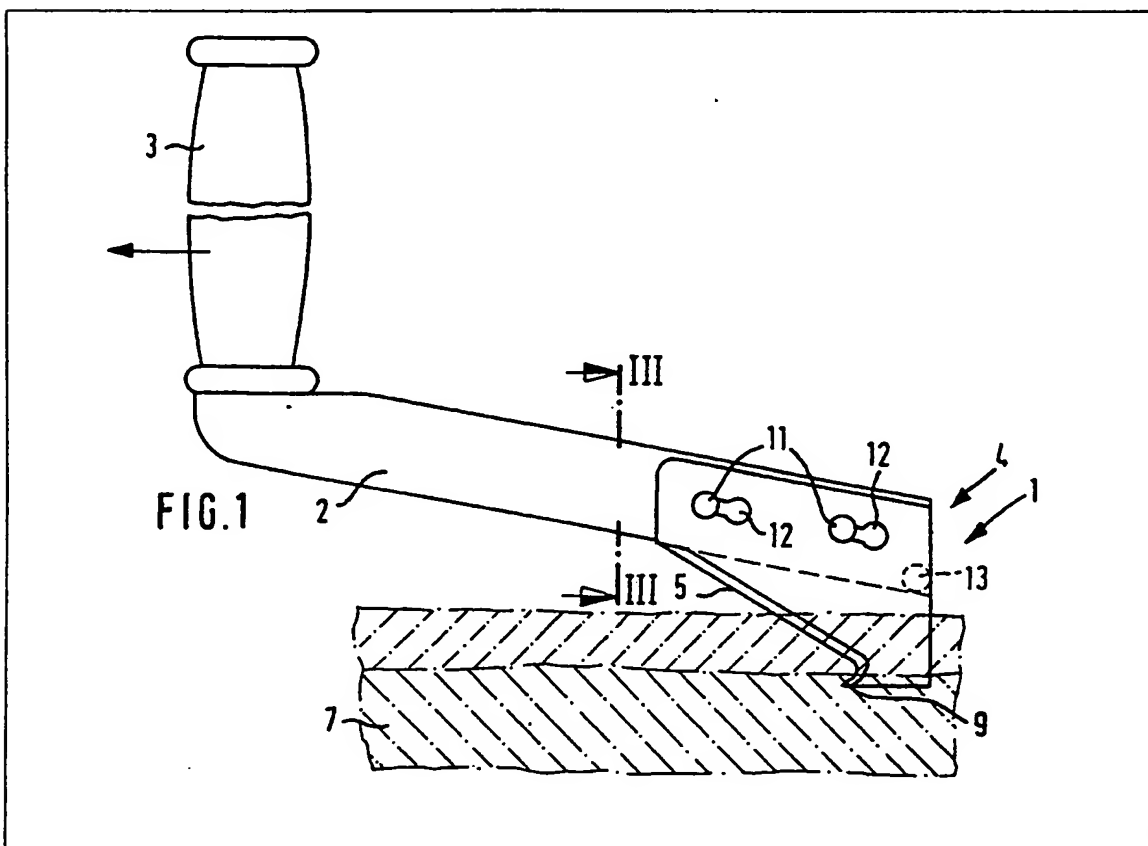
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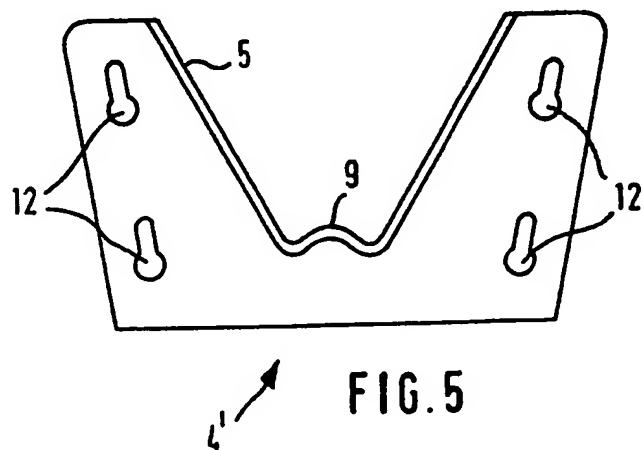
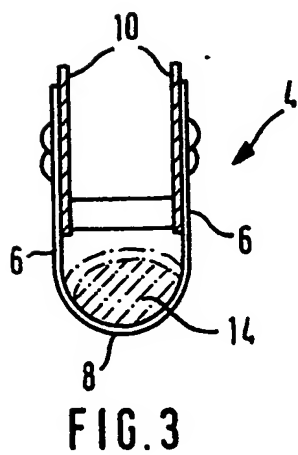
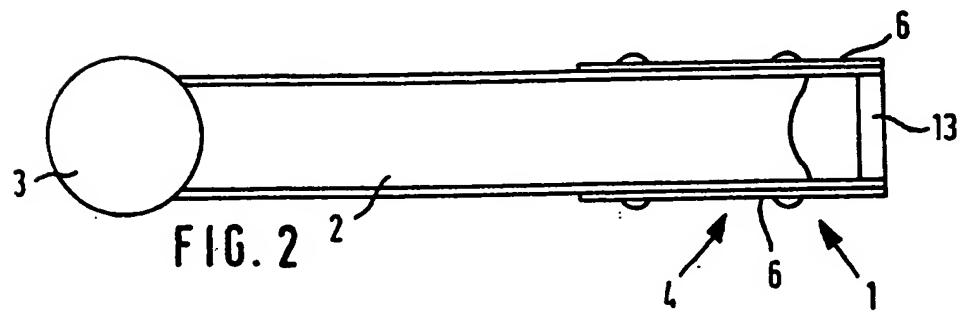
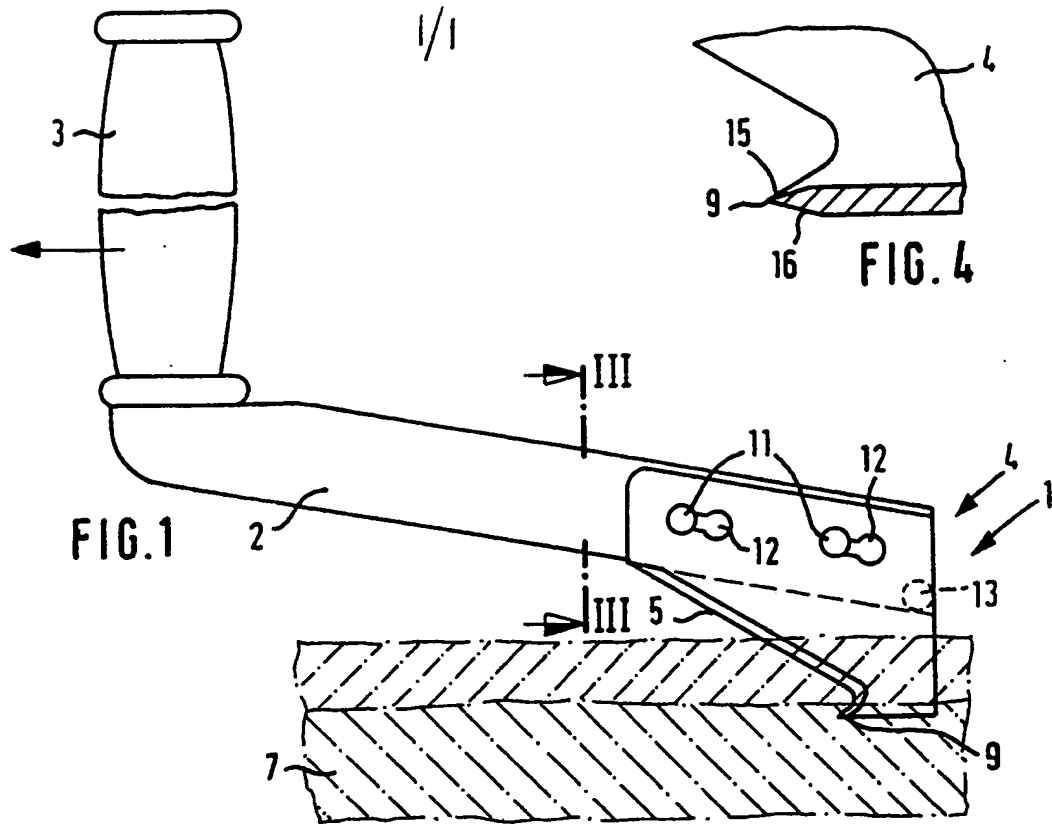
(54) Device for boning meat

(57) A knife head 1, which is U-shaped in cross-section, is formed from a knife 4 and is fastened releasably to one end of a holder 2, at

the other end of which a handle 3 is provided. The knife 4 projects beyond the underside of the holder 2, whereas the handle 3 protrudes beyond the upper side of the holder 2. A cutting edge 5 of the knife 4 follows the contour described by its U-shaped cross-section, extends inclined over the limb region and forms in the arc region a knife point 9. The cutting edge 5 of the knife 4 formed from a flat knife blade 4' is formed by ground surfaces 15, 16 which extend at differently acute angles to the knife blade plane.



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## SPECIFICATION

## A device for boning meat

This invention relates to a device for boning meat, that is to say for removing bones from meat, for example for taking out ribs from belly of pork and comprises a knife head with a knife, U-shaped in cross-section and equipped with a cutting edge following this cross-sectional contour, at one end of a holder, the other end of which is provided with a handle.

For the further processing of pieces of meat, more particularly of pieces of belly of pork, first of all the ribs contained therein have to be removed. This is effected, for example, in that the piece of belly is incised on both sides along each rib and then around an exposed end of the rib is placed the loop of a cord which, drawn at an acute angle to the longitudinal extent of the rib in the direction of the opposite end of the rib which is normally connected to a cartilage part, peels this rib out of the piece of meat to such an extent that the rib can finally be broken off from the piece of cartilage. This work is very time-consuming and energy-consuming.

Known from German Offenlegungsschrift No. 22 37 374 is a device which comprises a handle fastened to the front end of which are two knives which are arranged at a spacing parallel to one another, the spacing of the knives being adjustable to the rib width. A third knife supplements the pair of knives, in order to separate the rib on its underside from the piece of meat. Residues of pieces of meat, which if need be can be detached but with additional effort which bears no economical relationship to the product obtained thereby, adhere to ribs taken out with this device.

Known from German Offenlegungsschrift No. 24 25 816 is a rib extraction tool which is equipped on a handle, besides with a knife blade bent in a semicircular manner, with a thread loop. The layer of cartilage of the relevant rib end has to be forced through with the semicircularly-bent knife blade. Then the rib has to be raised at the end released from the cartilage and the thread loop has to be placed around the free end of the rib. In the raised state of the knife, upon applying an appropriate pulling force to the handle, the loop performs the separation between the piece of meat and the rib. This device has the advantage that the knife and the thread loop are united with one another in one device and can be used directly one after the other, so that virtually no residues of meat adhere to ribs extracted in this way. It is disadvantageous, however, that this process, too, requires considerable expenditure of force in order to draw the thread loop through and/or along each rib.

Furthermore, known from Austrian Patent Application No. 1548/77 is a tool for extracting ribs which is, in turn, equipped with two substantially flat knife blades which are adjustably arranged relative to one another on a handle and the respective cutting edge of which extends in a semicircular manner. The knife blades are

mounted swingably on the handle and are forced, under the influence of a spring, in the direction of the plane of symmetry. The knife blades are, however, so bent or curved that they initially butt laterally against a guide bar arranged additionally on the handle and extend parallel therewith and then each extend in the direction of the handle outwards in an arc. However, this tool, too, needs a thread loop in order to separate the underside of the rib from the piece of meat, and therefore requires the particularly great expenditure of force which is very disadvantageous.

Finally, known from German Offenlegungsschrift No. 30 39 241 is a device for boning rows of cutlets which, whilst dispensing with the use of a thread loop at one end of a holder, carries merely a knife head which has a knife which is U-shaped in cross-section and which has a cutting edge which follows the cross-sectional contour. At that end of the holder which lies opposite to the knife head there is a handle which protrudes on the same side of the holder as the knife head. The cross-sectional contour of the knife is adapted to the customary rib cross-section, in which case it has to be accepted that in the event of removal of ribs of smaller cross-section than usual, residues of pieces of meat are removed with the ribs. These residues are, however, as a rule negligibly small. In any event, this known device can be actuated with comparatively little expenditure of force. A considerable disadvantage of this device consists, however, in that the knife head has to be forced along the rib through the piece of meat. Upon the forwards movement of the knife head, therefore, only the side portions of the U-shaped knife are conducted along the bone, whereas the arc portion connecting the side portions can penetrate unimpeded arbitrarily deep into the piece of meat and as a function thereof detaches, on the relevant rib side, excessively large pieces of meat together with the bone. This disadvantage of the known device can virtually only be avoided when the handling of the device is effected with particularly great skill.

The problem underlying the invention is to provide a device, of the kind discussed at the introduction hereof, which requires, for its actuation, a relatively small expenditure of force without pre-supposing particular skill in using the device.

Starting from the device referred to at the beginning hereof, to solve the problem it is proposed that the knife head should protrude at that side of the holder which lies opposite to the handle and the cutting edge of the knife should point in the direction of that end of the holder which is provided with the handle.

As a result of the diametrical or opposed arrangement, in accordance with the invention, of the knife head at the one end of the holder and of the handle at the other end of the holder, as well as through the alignment of the cutting edge in the direction of that end of the holder which is provided with the handle, the device can be actuated in by way of a drawing cut so that more

particularly also the central bent cutting-edge portion connecting the two cutting-edge side portions experiences guidance by the underside of the rib, so that no pieces of meat remain thereon.

5 The device can be drawn through the meat without particular skill with the knife head disposed in such a way that the arcuate central cutting-edge portion scrapes correctly along the bone that is to be extracted.

10 The introduction of the knife head into the piece of meat as well as more particularly the guidance of the knife on the underside of the rib is facilitated in accordance with a development of the invention by the cutting edge of the knife extending, in the  
15 region of the U-limbs, at an acute angle to the longitudinal extent of the holder and forming, in the region between the U-limbs of the arcuate cutting-edge portion, a knife point which protrudes in the direction of that end of the holder  
20 which is provided with the handle.

As a result of the acute-angled design of the cutting-edge portions forming the limbs of the knife, a so-called drawing cut through the piece of meat can be effected, whereas the knife point on  
25 the arcuate cutting-edge portion initially facilitates the penetration of the knife head into the piece of meat and subsequently favours the guidance by the underside of the rib, without the knife being blocked by the rib within a comparatively large  
30 angular region between the knife point and the longitudinal axis of the rib.

In accordance with a further development of the invention, provided in the edge strips forming the limbs of the knife are openings through which  
35 fastening pins, protruding on both sides of the holder and mushroom-shaped in configuration, engage in a bayonet-like manner.

With this design, a knife head can be exchanged for another one in a simple way, so  
40 that, for example, the device can also be fitted successively with differently-dimensioned knife heads.

A particularly advantageous development of the invention provides for the fact that the knife  
45 consists of a flat knife blade which is bent in a U-shaped manner only under bias.

Knife blades which are flat in configuration can be produced in a considerably simpler manner and if necessary can also be re-ground more simply in  
50 the flat state. Added to this, in connection with the device in accordance with the invention, is additionally the considerable advantage that a comparatively thin-walled knife blade is adequate for the purpose and naturally reduces the pulling  
55 force which has to be applied to achieve the cutting operation. A knife blade which is flat in form can have a comparatively great stiffness imparted thereto by being bent to U-shaped configuration under bias or stress.

60 Preferably the cutting edge of the knife is formed by two-sided grinding of the knife blade, with the two ground surfaces forming differently acute angles with the knife-blade plane.

As a result of this development of the invention  
65 the possibility emerges of so clamping the knife

blade that the more obtuse-angled ground surface points inwards, i.e. faces the bone that is to be removed, whereby, additionally, the risk is reduced of the knife edge hooking into the surface of the  
70 bone. The opposite more acute-angled ground surface leads to the fact that at all times a sufficiently large force component directs the knife to the surface of the bone.

Finally, a further development of the invention  
75 additionally provided for the possibility of the holder consisting, in the region of the knife head, of two flanks which are connected, in the vicinity of their free ends, to a supporting bolt or pin.

The two flanks of the holder prevent the view of  
80 the point of use of the knife head being obstructed by the holder. The optimum point of use as well as the extent of action of the knife can be accurately observed between the two flanks. The supporting bolt does, indeed, also serve for stabilising the  
85 flanks and thus the holder as a whole, but its primary function consists in supporting the rib bone on its upper side at the end of the cutting operation, so that upon swinging movement of the holder about the central axis of the supporting bolt  
90 the rib bone can be broken off effortlessly from the piece of cartilage at the cartilage end.

An exemplified embodiment of the device in accordance with the invention is shown in the accompanying drawing, in which:

95 Fig. 1 is a side view illustrating the device in use boning a piece of meat;

Fig. 2 is a plan view of the device of Fig. 1;

Fig. 3 is a section taken along the line III—III of Fig. 1;

100 Fig. 4 is a longitudinal sectional detail of part of Fig. 1 to an enlarged scale; and

Fig. 5 shows a top view illustrating a knife blade in its flat form before being embodied into the device of Figs. 1 to 3.

105 The illustrated device comprises a knife head 1, which is fastened releasably to one end of a holder 2. At its opposite end the holder 2 is equipped with a handle 3. In the working position of the device, the handle 3 fastened on the upper side of  
110 the holder 2 is aligned vertically, whereas the central axis of the holder 2 extends at an acute angle to the horizontal and the knife head 1 projects, at the lower-situated end of the holder 2, beyond the underside thereof.

115 The knife head 1 consists of a knife 4 which is U-shaped in cross-section and the cutting edge 5 of which extends in accordance with its cross-sectional contour. Over the region of U-limbs 6 of the knife 4 the cutting edge 5 is inclined at an  
120 acute angle to the horizontal surface of a piece of meat 7, whilst over the region of an arc 8, connecting the U-limbs, of the knife 4 the cutting edge 5 forms a knife point 9 which points in the direction of that end of the holder 2 which is  
125 provided with the handle 3.

The holder 2 consisting of two flanks 10 is provided in the region of the knife head on each side with two laterally-protruding mushroom-shaped fastening pins 11 which are arranged so  
130 as to be offset at a spacing over the longitudinal

extent of the holder 2. Correspondingly-dimensioned slot-shaped openings 12 in the U-limbs 6 of the knife 4 makes possible bayonet-like connection of the knife head 1 to the holder 2, which can be cancelled only in that at the knife head 1 or the holder 2 a force acting against the actuating direction of the device is exerted.

At the end of the flanks 10 which are formed from flat iron, these flanks are connected together by way of a horizontal supporting bolt 13 which serves as an abutment for a rib 14 which has been taken out of the piece of meat 7 but which still adheres by one end to a piece of cartilage (Fig. 3).

The cutting edge 3 is formed by two ground surfaces 15, 16 (Fig. 4), of which the ground surface 15 pointing inwardly to the knife head 1 stands at a less acute angle to the central plane of the knife 4 than does the ground surface 16 pointing outwards away from the knife head 1.

The knife 4 is formed from a flat knife blade 4' (Fig. 5), in that it has been bent under bias in such a way that the U-shaped cross-sectional contour emerges, which is maintained by the bayonet-like connection to the holder 2 in the clamped state. Instead of re-grinding the knife 4 when its cutting edge 5 has become blunt, the knife 4 can economically and simply be replaced by a new one.

#### CLAIMS

1. A device for boning meat for example for removing ribs from pig's belly, comprising a knife head with a knife U-shaped in cross-section and equipped with a cutting edge which follows this cross-sectional contour, at one end of a holder, the other end of which is provided with a handle,

characterised in that the knife head protrudes at the side of the holder which lies opposite to the handle and the cutting edge of the knife points in the direction of that end of the holder which is provided with the handle.

2. A device as claimed in claim 1, characterised in that the cutting edge of the knife extends, in the region of the U-limbs, at an acute angle to the longitudinal extent of the holder and forms, in the region between the U-limbs, a knife point which protrudes in the direction of that end of the holder which is provided with the handle.

3. A device as claimed in claim 1 or 2, characterised in that openings are provided in edge strips forming the limbs of the knife, through which openings fastening pins, protruding on both sides of the holder and designed in a mushroom-shaped form, and engage in a bayonet-like manner.

4. A device as claimed in claims 1 to 3, characterised in that the knife consists of a flat knife blade which is bent in a U-shaped manner only under bias or stress.

5. A device as claimed in any preceding claim characterised in that the cutting edge of the knife is formed by a grinding, on both sides, of the knife blade, the two ground surfaces forming differently acute angles with the knife blade plane.

6. A device as claimed in any preceding claim characterised in that the holder consists, in the region of the knife head, of two flanks which are connected, in the vicinity of their free ends, to a supporting bolt pin.

7. A device for boning meat as claimed in claim 1 and substantially as hereinbefore described with reference to the accompanying drawings.